

Kerr Lake Vegetation Survey

February 11, 2016

Report submitted by NC State University

Background

Hydrilla (*Hydrilla verticillata*) is a non-native invasive submersed aquatic plant. This plant was first documented in Wake County, North Carolina in 1980. Initial infestations were confined to small ponds and lakes, however, by 1988 it had spread into Lake Gaston. The plant continued to spread across North Carolina and increased acreage in both the North Carolina and Virginia portions of Lake Gaston into the 1990's.

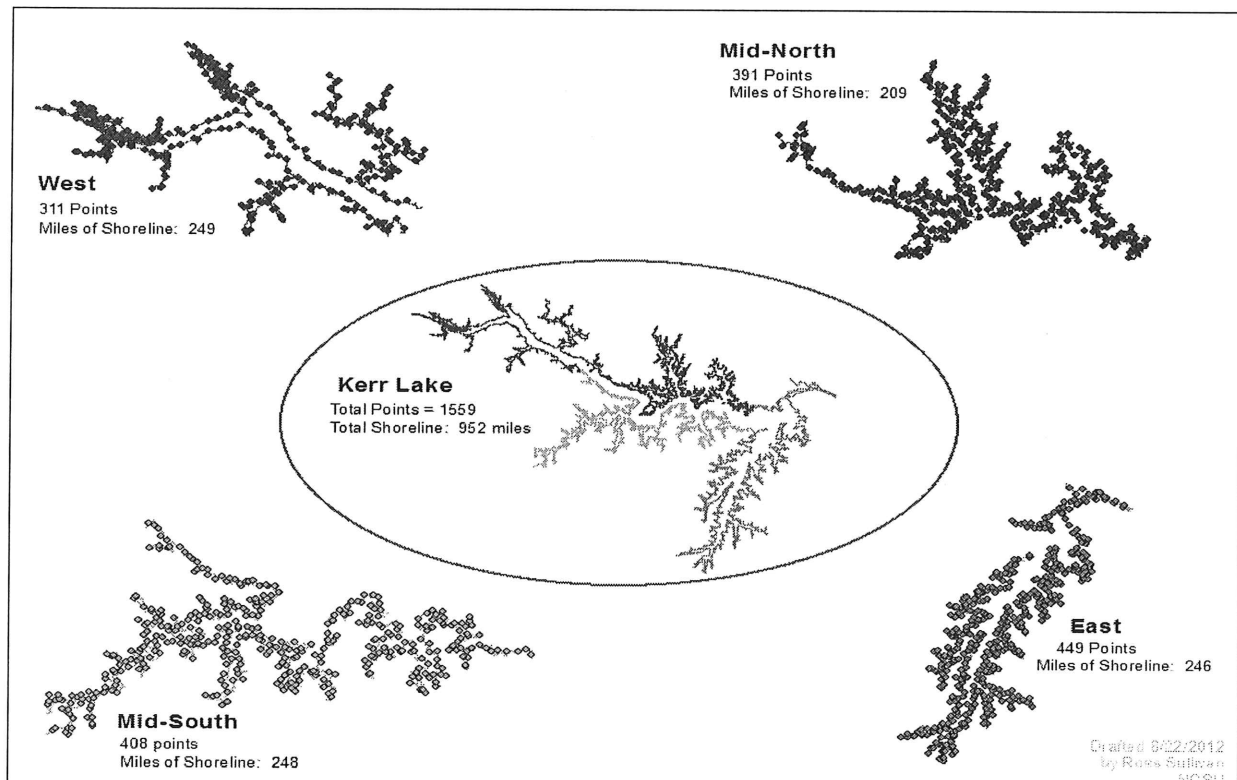
In the fall of 1992, hydrilla was documented in the North Bend Park portions of Kerr Lake. The first reports were of small patches in the back of one cove near a boat ramp. Because of the location (near the dam, and adjacent to Lake Gaston) it was thought that boats traveling between the two lakes had been the primary method of dispersion. Following surveys in this area, additional small patches (approximately 8 A total) were discovered in 1993. Other portions of Kerr Lake were not surveyed, however, some boat ramps in the NC portion of the lake were examined and no Hydrilla found. Treatments of the known locations of Hydrilla were started in 1993, using a contact herbicide Aquathol-K (endothall) plus a sinking agent Nalquatic. Based on information from NCDNR Aquatic Weed Control Program records the treatments were successful and only conducted in 1993 and 1994. In July 1996 after reports of weed problems in the Satterwhite Point area, a survey of that area was conducted. Several locations were found to contain Chara and Brittle Naiad (*Najas minor*). No additional information on surveys or treatments was found.

In the summer of 2009, there were reports of problematic Hydrilla infestations in the North Carolina portions of Kerr Lake. Additional reports in 2010 gave indication of an increasing problem in these areas. Paul McKenzie, (Vance County, NC Cooperative Extension Agent) sent several samples to NC State University for positive identification and organized a survey of the North Carolina portions of Kerr Lake mainly in the areas of Nutbush and Little Nutbush Creeks. A group of local volunteers and representatives of various governmental agencies participated and found Hydrilla in many of the areas surveyed. Reports from others indicated that hydrilla may be more widespread and actual locations and acreages were unknown. A full lake survey was conducted in the fall of 2011 indicating 698 A of Hydrilla.

Methods

The survey began September 17, 2015 and was completed on November 18, 2015. During the survey timeframe, the lake elevation ranged between approximately 297 and 305 feet msl. Shoreline use and lake digital map information was provided by USACE to be used in completing this survey.

Beginning in 2012, a point intercept method was incorporated in order to more accurately determine species presence/absence and assist in determining Hydrilla spread. A total of 1559 points were placed at an approximately 0.5 mile interval around the shoreline based on USACE shoreline shape file. Some of these points occurred in areas that were not accessible for various reasons including low water, behind culverts, below dam structure. Of the predetermined points, 1307 were actually sampled for vegetation in 2015 (1245 in 2012, 1316 in 2013, 1336 in 2014). The sample method included visual observation of area and 2 rake tosses at each point (or as close as possible to actual point). In addition, Sonar (same method as 2011) was used in areas where Hydrilla was found, along with hand drawn maps and notes. In addition, rake samples were taken at two points around all boat ramps.



Results

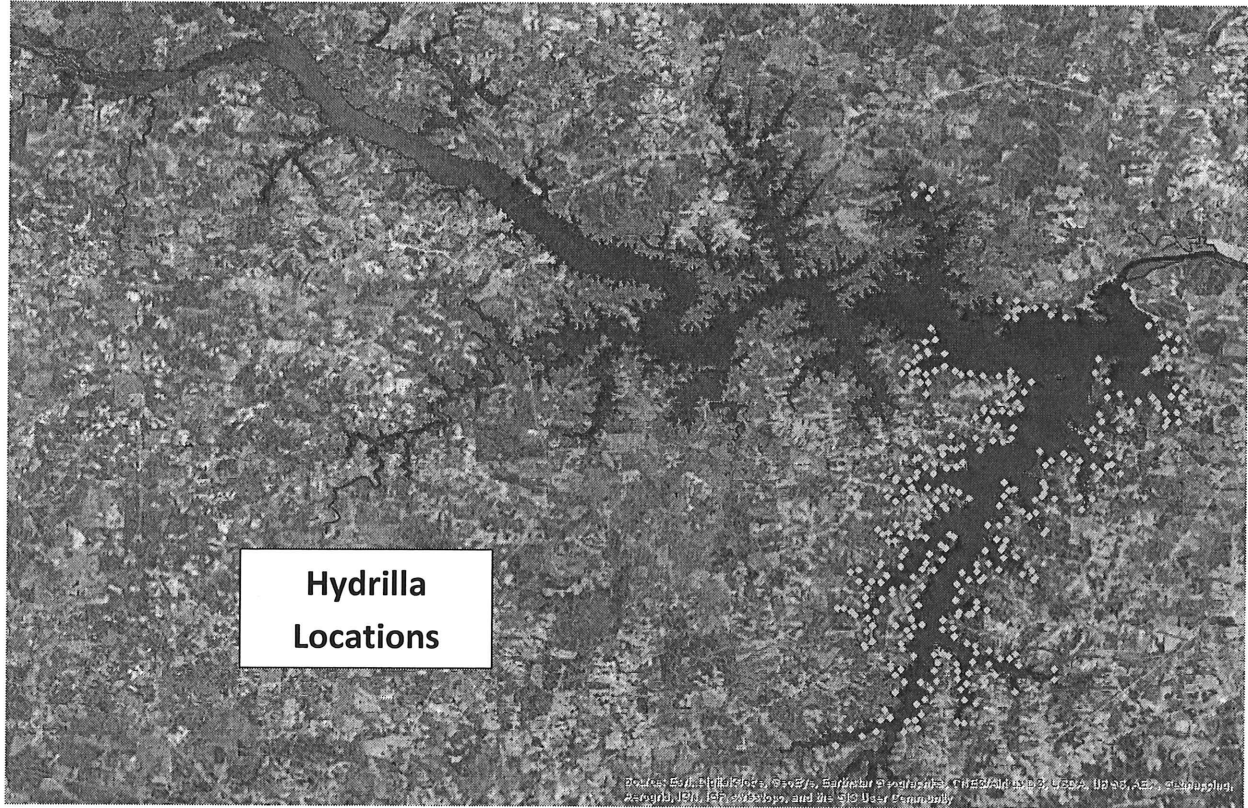
During the survey period, high water levels and heavy flow made acreage estimations difficult. In addition lake elevation drop before the beginning of the survey desiccated much of the hydrilla growth between elevation 294 and 300 ft. elevation. Most of the living hydrilla biomass remained well below the surface. In shallow water (4 ft. or less) no rooted plants were observed, however dense beds of plants were found in water depths of 6 to 12 ft. Hydrilla was the most frequent plant observed in areas where dense plant beds were present. Several other plant species were found in significant quantities in many locations throughout the lake. Native submersed plants included *Chara sp./Nitella sp.* (macroalgae), *Potamogeton diversifolius* (variable leaf pondweed), *Potamogeton pectinatus* (sago pondweed), *Najas guadalupensis* (southern naiad). Several locations also had *Najas minor* (brittle naiad) a non-native invasive species.

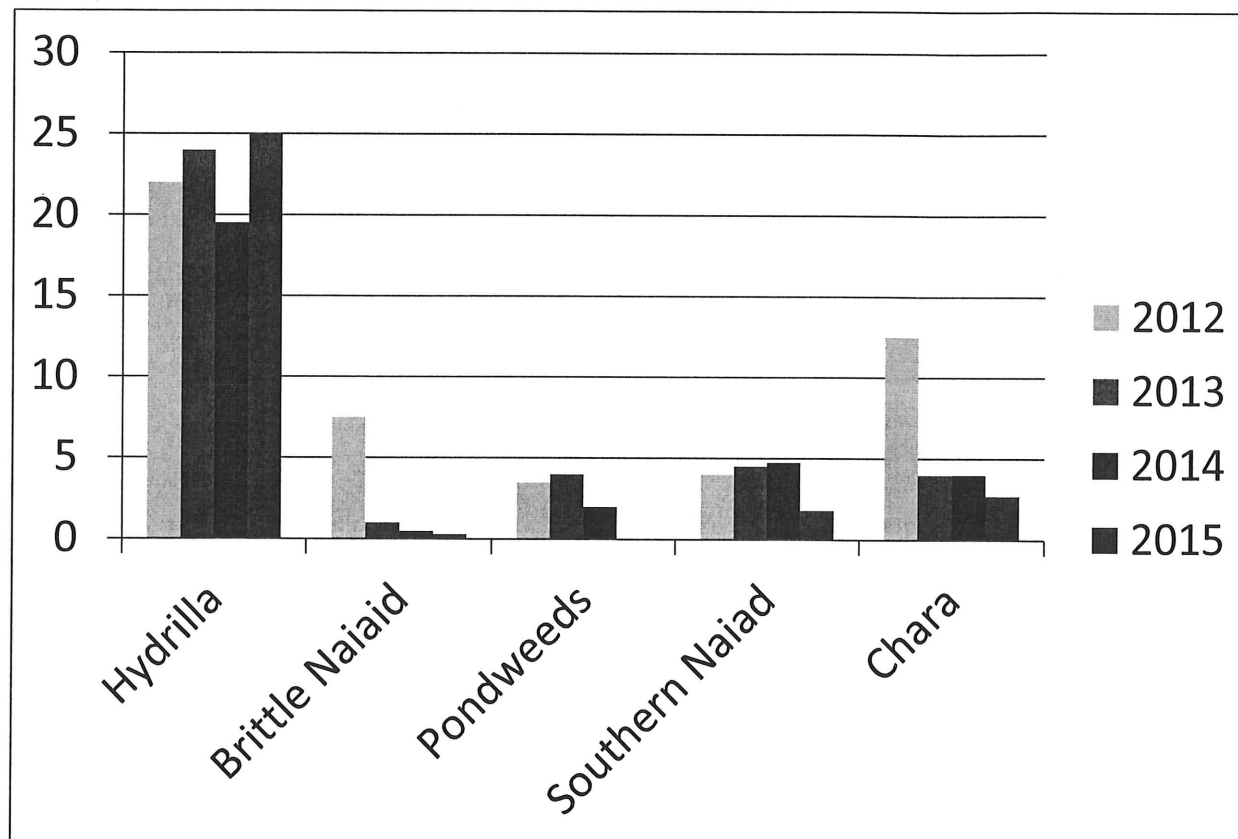
Because the SONAR unit defined areas of submersed plants without species identification, hand drawn maps were used to determine areas of Hydrilla infestations. The information was transferred from the maps into ArcGIS software and this information was converted to shapefiles and used to determine acreage. The information was then compared to the processed data from Contour Innovations and slight corrections made based on both sources.

A CD of the shapefile information is included.

During the survey process it was again noted that most of the hydrilla infestations occurred in areas of high human use including State Parks, boat ramps, commercial marinas, and in areas of higher populations of people based on number of docks. As in previous years large areas of undeveloped shoreline west of Nutbush Creek were found to contain almost no Hydrilla. It was noted in 2013 that Hydrilla has begun to spread west and north outside the Nutbush Creek area. Additional points were found in the same area in 2015, but infestations are generally small in size. The single point in Eastland Creek that was identified in 2013 as having Hydrilla was again found in 2015 and the area has expanded to approximately 11 acres. Close monitoring of this area will continue in future surveys. Several additional points had rooted hydrilla, but the total area was very limited (.1 A total).

In contrast to previous surveys, the areas around Stanton View and west of the bridges in Clarksville were almost completely clear of hydrilla. One point in a small cove on the Stanton River had hydrilla. Heavy rainfall and high flows most likely scoured the areas where hydrilla had been observed in the past. It was noted during the survey that many hydrilla fragments were seen in the floating debris (logs and trash) around and east of the bridges.





Percent Plant Occurrence by Species
(based on 1245 points in 2012, 1345 points in 2013 and 1336 points in 2014, 1308 in 2015)

**Native
Species**

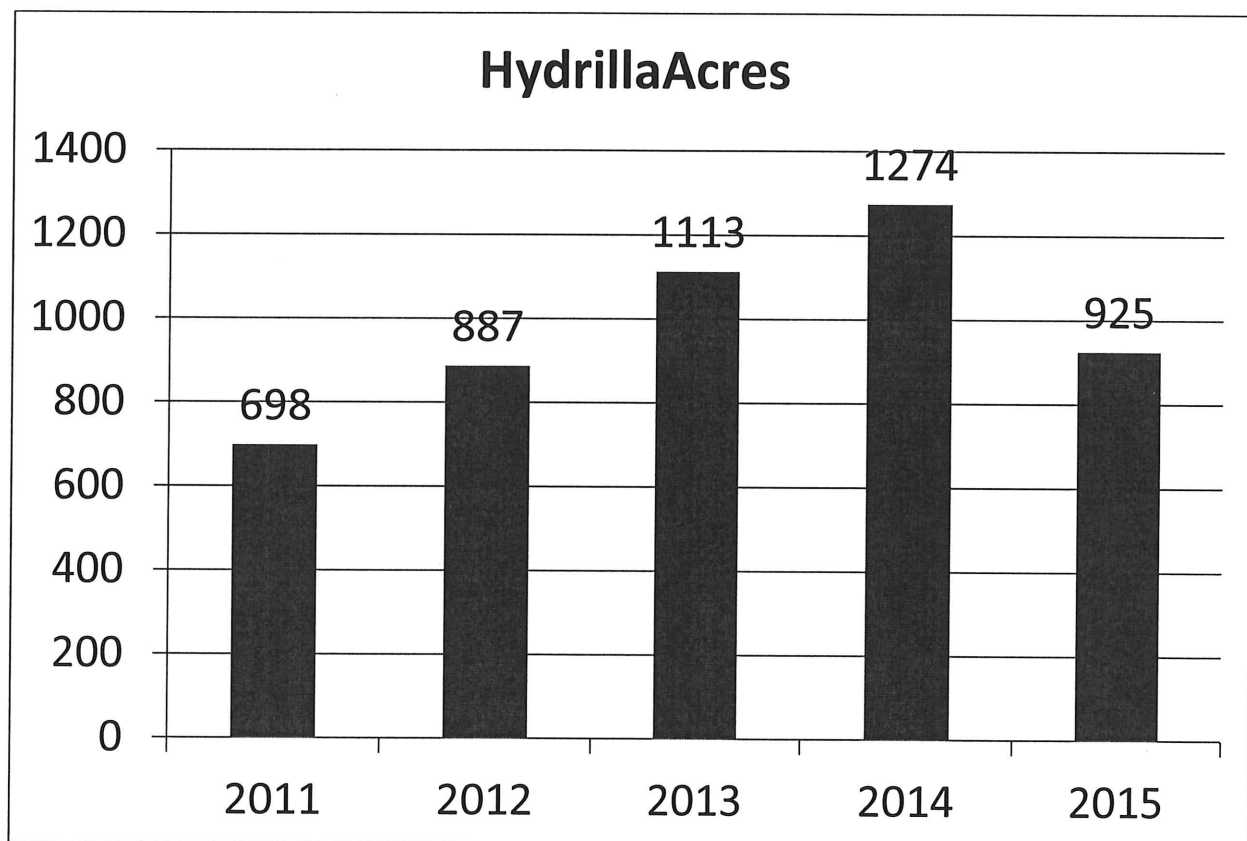
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AeroGRID, IGN, and the GIS User Community

Source: FBI, Manuscript, Records, Eastern Group, 91-227420-18, 181F, 1856, 2E. See mapping report, 101, 102, 215-216, and the FBI Lab. Comments.

Hydrilla Infestations in 2015:

1. Little Nutbush Creek continues to have the largest continuous areas of shoreline containing Hydrilla; the back of numerous coves had extensive populations as well as many small scattered populations.
2. Nutbush Creek has several large populations of Hydrilla, but also areas with Chara/Nitella and Naiads (esp. *Najas minor*).
3. North Bend Park the site of the original infestations has several small but apparently expanding populations.
4. Expansion in Eastland Creek and areas west of Nutbush Creek need to be monitored.
5. Several areas where Hydrilla was documented in 2013 including: Staunton View ramp area, Clarksville Marina, and scattered locations along the south shore west of Clarksville bridges, continue to need monitoring. If stable water levels occur this area will most likely see a rebound of past hydrilla populations.
6. Alligator weed (*Alternanthera philoxeroides*) was again found in two areas in the western section of the lake, in addition, Curly-leaf pondweed (*Potamogeton crispus*) another non-native species was seen in the Dan River area (no rooted plants). Continued monitoring and surveys further up river may be needed.

Based on the information obtained during the survey, our estimated total acreage of Hydrilla in Kerr Lake is 925 acres, located mainly in Nutbush Creek and Little Nutbush Creek. Of the 349 acre decrease in 2015, the western part of the lake near the Staunton View area and west of bridges at Clarksville account for most of the difference. Hydrilla populations in this area have been noted in previous years and density will be extremely dependant on water level and flow in future years.



Recommendations

Additional whole lake surveys should be conducted to determine spread and document impacts on public use areas and native plant populations. Frequency of these whole lake surveys could be based on random point surveys conducted annually.

Grass carp (*Ctenopharyngodon idella*) would be the cheapest management option for full lake hydrilla control. Normal stocking rates would be 15 fish / hydrilla vegetated acre. However, submersed native plants may also be controlled.

Contact herbicides applied by USACE approved applicators may be the best option for control in some areas. Certain sections of the currently infested North Carolina portion of the lake may be suitable for systemic herbicides, but water flow will limit their use. Any herbicide applications should be made by these approved applicators and reports containing acres treated, herbicides used and rates, evaluation of biomass reduction (treatment effectiveness), and other information should be made to the USACE for future determinations of treatments.

Signs should be placed at all boat ramp/marina locations to help limit unintentional spread in Kerr and to other water bodies. Information should also be provided to State Park visitors and others to aid in public awareness of invasive species.

Information should also be provided to private individuals with "lake front" property, and/or docks. This information could provide instructions for chemical treatments and proper identification of native and non-native plant species. In addition, a reporting system to track new infestations should be implemented. These individuals should be encouraged to rake out or otherwise remove floating mats in the fall to slow spread.

Public funds (unknown sources) should be used to treat in areas around public facilities including swimming areas and boat ramps. Repeat applications may be needed and applicators should be required to follow-up in order to reduce tuber formation.

